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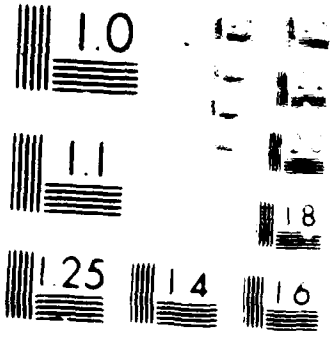
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[illegible] the development of smooth nonparametric [illegible] censored data and the further study of smooth [illegible] In particular, kernel-type and "generalized" [illegible] under censoring which give better estimates of [illegible] the usual or product-limit quantile estimator. [illegible] empirical Bayes estimators, prediction [illegible] nonparametric hazard rate estimation under [illegible] step-stress accelerated life tests under censoring. [illegible] when cause of failure is partially known, [illegible] confidence intervals for pairwise differences of [illegible] treatments with a control.

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SUMMARY OF ACCOMPLISHED WORK UNDER THE AIR FORCE GRANT AFOSR-83-0229

P.I.: Dr. P. Papantoni-Kazakos
The University of Connecticut

Part of the accomplished work is summarized in the following reports submitted to AFOSR:

H. Tsaknakis, D. Kazakos and P. Papantoni-Kazakos, "Robust Prediction and Interpolation for Vector Stationary Processes-2d Enriched Version", The University of Connecticut, Department of Electrical Engineering and Computer Science, UCT/DEECS/TR-83-10, July 1983.

H. Tsaknakis and P. Papantoni-Kazakos, "Robust Linear Filtering for Multivariable Stationary Time Series-2d Enriched Version", The University of Connecticut, Department of Electrical Engineering and Computer Science, UCT/DEECS/TR-83-9, July 1983.

M. Georgiopoulos and P. Papantoni-Kazakos, "Random Access Algorithm Utilizing Control Mini Slots", The University of Connecticut, Department of Electrical Engineering and Computer Science, Technical Report TR-83-14, August 1983.

P. Papantoni-Kazakos, "Qualitative Robustness in Time Series", The University of Connecticut, Department of Electrical Engineering and Computer Science, UCT/DEECS/TR-83-15, November 1983.

L. Georgiadis and P. Papantoni-Kazakos, "A High Throughput Limited Sensing Protocol", The University of Connecticut, Department of Electrical Engineering and Computer Science, TR-84-1, February 1984.

L. Georgiadis and P. Papantoni-Kazakos, "Limited Feedback Sensing Algorithms for the Broadcast Channel", The University of Connecticut, Department of Electrical Engineering and Computer Science, TR-84-8, June 1984.

H. Tsaknakis, D. Kazakos, and P. Papantoni-Kazakos, "Robust Prediction and Interpolation for Vector Stationary Processes-Part 3", The University of Connecticut, Department of Electrical Engineering and Computer Science, UCT/DEECS/TR-84-11, October 1984.

H. Tsaknakis and P. Papantoni-Kazakos, "Robust Linear Filtering for Multi-variable Stationary Time Series - Part 3", The University of Connecticut, Department of Electrical Engineering and Computer Science, UCT/DEECS/TR-84-12, October 1984.

M. Georgiopoulos, L. Merakos, and P. Papantoni-Kazakos, "An Asynchronous Stack Algorithm for CSMA and CSMA-CD Channels," The University of Connecticut, Department of Electrical Engineering and Computer Science, Technical Report TR-84-13, November 1984.

L. Georgiadis and P. Papantoni-Kazakos, "Ergodicity and Steady-State Equilibrium Conditions for Markov Chains", The University of Connecticut, Department of

Electrical Engineering and Computer Science, UCT/DEECS/TR-85-1, January 1985.

M. Georgiopoulos, L. Merakos, and P. Papantoni-Kazakos, "High Performance Asynchronous Limited Sensing Algorithms for CSMA and CSMA-CD Channels", The University of Connecticut, Department of Electrical Engineering and Computer Science, UCT/DEECS/TR-85-2, January 1985.

L. Georgiadis and P. Papantoni-Kazakos, "A 0.487 Throughput Limited Sensing Algorithm", The University of Connecticut, Department of Electrical Engineering and Computer Science, UCT/DEECS/TR-85-3, March 1985.

L. Georgiadis, L. Merakos, and P. Papantoni-Kazakos, "Unified Method for Delay Analysis of Random Multiple Access Algorithms", The University of Connecticut, Department of Electrical Engineering and Computer Science, UCT/DEECS/TR-85-8, August 1985.

H. Tsaknakis and P. Papantoni-Kazakos, "Outlier Resistant Filtering and Smoothing", UCT/DEECS/TR-86-5, April 1986, University of Connecticut.

L. Merakos, L. Georgiadis, and C. Bisdikian, "Stability Analysis of Interconnected Random Access Networks", UCT/DEECS/TR-86-6, April 1986, University of Connecticut.

H. Tsaknakis and P. Papantoni-Kazakos, "Outlier Resistant Filtering and Smoothing", UCT/DESE/TR-86-9, September 1986, University of Connecticut.

R. K. Bansal and P. Papantoni-Kazakos, "Outlier Resistant Algorithms for Detecting a Change in Schochastic Process", TR-87-1, January 1987, University of Connecticut.

In short, some of the significant contributions made in the July 1, 1983 to June 30, 1987.

1. We formulated a theory for robust filtering and smoothind, that combines the qualitative robustness theory with the theory of saddle-point games. On the basis of this theory, we found robust filters for certain contaminated classes of stochastic processes. We recently modified our qualitative robustness for general time series operations. We proposed then breakdown point and sensitivity measures, and in conjunction with saddle-point game theoretic results, we determined robust classes of filters, predictors, and interpolators.

2. We designed robust predictors, interpolators, and filters, for various classes of vector stationary processes with contaminated spectra. We extensively analyzed the above operations, and we produced measures of breakdown points and curves, efficiency, and performance variation within the classes.

3. We designed and analyzed a variety of multiple-access transmission protocols, for various levels of available feedback and feedback sensing. In our studies we included asymptotically-many user models. We devised limited sensing algorithms, with the highest existing throughput, to this point in time, and with robust characteristics in the presence of feedback errors.

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4. We devised a unified methodology for the delay analysis of a big variety of random-access algorithms.

5. We designed and analyzed algorithms that detect changes in stochastic process. We studied their asymptotic optimality, and we modified and analyzed their operations, for resistance to extreme data outliers.

Publications

Journal Papers:

D. Kazakos and P. Papantoni-Kazakos, "Modeling of Multidimensional Signals with Applications to Images", in progress in Multidimensional Systems Theory, Marcel Dekker, N.Y., 1985.

P. Papantoni-Kazakos, "Some Aspects of Qualitative Robustness in Time Series", in Robust and Nonlinear Time Series Analysis. Lecture Notes in Statistics, Vol. 26, Springer-Verlag, 1985.

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P. Papantoni-Kazakos, "A Game Theoretic Approach to Robust Filtering", Information and Control, Vol. 60, pp. 1735-1757, 1984.

L. Georgiadis and P. Papantoni-Kazakos, "Limited Feedback Sensing Algorithms for the Broadcast Channel", IEEE Trans. Inform. Th., Special issue on Random Access Communication, March 1985, IT-31, pp. 280-294.

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H. Tsaknakis, D. Kazakos, and P. Papantoni-Kazakos, "Robust Prediction and Interpolation for Vector Stationary Processes", Prob. Th. and Related Fields, 72, Springer-Verlag, 1986, pp. 589-602.

L. Georgiadis and P. Papantoni-Kazakos, "A 0.487 Throughput Limited Sensing Algorithm", IEEE Trans. Inform. Th., March 1987, IT-33, No. 2, pp. 233-237.

P. Papantoni-Kazakos, "Qualitative Robustness in Time Series", Information and Control, Academic Press, March 1987, Vol. 72, No. 3, pp. 239-269.

L. Georgiadis, L. Merakos, and P. Papantoni-Kazakos, "A Method for the Delay Analysis of Random Multiple Access Algorithms whose Delay Process is Regenerative", IEEE Journal on Selected Areas in Communications, July 1987, to appear.

Book Chapters:

M. Georgiopoulos, L. Merakos, and P. Papantoni-Kazakos, "High Performance Asynchronous Limited Sensing Algorithms for CSMA and CSMA CD Channels", in Local AREA and Multiple Access Networks, Ed. Pickholtz, Computer Science Press, 1986.

Papers Submitted to Journals:

H. Tsaknakis and P. Papantoni-Kazakos, "Outliner Resistant Filtering and Smoothing", IEEE Trans. Inf. Theory.

L. Georgiadis, L. Merakos, and P. Papantoni-Kazakos, "A Unified Method for Delay Analysis of Random Multiple Access Algorithms", IEEE Journal on Selected Areas in Communications, Issue on Performance Evaluation of Multiple Access Networks.

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H. Tsaknakis, "Robust Methods in Time Series", Ph.D. Thesis, University of Connecticut, 1986.

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R. K. Bansal, "Outlier Resistant Algorithms for Detecting a change in Stochastic Process", Ph.D. Thesis, University of Connecticut, 1987.

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P. Papantoni-Kazakos, "Performance Bounds in Robust Filtering and Smoothing", 1983 International Symposium on Information Theory, Montreal, Canada.

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L. Georgiadis and P. Papantoni-Kazakos, "A Free Access Collision Resolution Algorithm for the Slotted Broadcast Channel", 1984 Conf. on Information Sciences and Systems, Princeton, March.

H. Tsaknakis and P. Papantoni-Kazakos, "Robust Linear Filtering for Multi variable Stationary Time Series", 1984 Conf. on Information Sciences and Systems, Princeton, March

M. Georgiopoulos, L. Merakos, and P. Papantoni-Kazakos, "Collsion Resolution Protocols for Random Access Channels with Bandwidth and Energy Overhead," IEEE GLOBECOM '84, November 1984.

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R. K. Bansal and P. Papantoni-Kazakos, "Outlier Resistant Algorithms for Detecting a Change in Stochastic Process", 1987 Conference on Information Sciences and Systems.

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